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Control. [Oct. 3, 1955]

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TRANSCRIPT OF PROCEEDINGS \* \* \* \* \*

HEARING OF THE SUBCOMMITTEE  
ON  
FREEWAY TRAFFIC CONTROL,

[OCT, 3. 1955] 41P, (processed)  
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*California Legislature*

ASSEMBLY INTERIM COMMITTEE ON TRANSPORTATION AND COMMERCE,  
L. M. "Lee" Backstrand, Chairman  
Vernon Kilpatrick  
Frank Lanterman  
Charles W. Meyers  
Thomas M. Rees  
William Byron Rumford  
Charles M. Wilson

Dr. Michael T. Wermel, Committee Consultant  
Barbara A. Miller, Committee Secretary

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ASSEMBLY INTERIM COMMITTEE  
on  
TRANSPORTATION AND COMMERCE

L. M. Backstrand, Chairman

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Hearing of the Subcommittee on Freeway Traffic Control held on  
October 3 at 10:00 a.m., in Room 2170, State Capitol, Sacramento.

L. M. "Lee" Backstrand, Chairman

MEMBERS PRESENT:

L. M. Backstrand  
Vernon Kilpatrick  
Frank Lanterman  
Thomas M. Rees  
William Byron Rumford  
Charles M. Wilson

MEMBERS ABSENT:

Charles W. Meyers

OTHER MEMBERS PRESENT:

Frank P. Belotti  
Walter I. Dahl  
Clayton A. Dills  
Edward M. Gaffney  
Francis C. Lindsay

STAFF MEMBERS PRESENT:

Dr. Michael T. Wermel, Committee Consultant  
Barbara Miller, Committee Secretary

OTHERS PRESENT AND HEARD:

Norman Kennedy, Institute of Transportation and Traffic Engineering,  
University of California at Berkeley  
Inspector D. J. O'Connell, California Highway Patrol  
Sergeant John Keegan, San Francisco Police Department  
Harry Cheshire, Automobile Club of Southern California  
C. M. Gilliss, Deputy Director, Department of Public Works  
Richard Carpenter, General Counsel and Director, League of  
California Cities



CHAIRMAN BACKSTRAND: This hearing is called under the authority of House Resolution No. 216, which reads in part as follows:

"The Assembly Standing Committee on Transportation and Commerce is hereby constituted an interim committee and is authorized and directed to ascertain, study and analyze all facts relating to transportation and commerce, including all matters within the field covered by the Vehicle Code, rapid transit highways, streets, bridges, and tubes, transit authorities, means of facilitating transit, problems incident to motor vehicle and other types of transportation, including but not limited to the operation, effect, administration, enforcement and needed revision of any and all laws in any way bearing upon or relating to the subject of this resolution, and to report thereon to the Assembly, including in the reports, its recommendations for appropriate legislation."

I think as most of you know at the organizational meeting, the Committee was divided into four subcommittees and the meeting of this particular subcommittee is designed to study matters pertaining to freeways and their attendant ills of congestion, accidents, and things of that kind. Now, in going over this subject with Dr. Wermel and others, it became apparent that if we were going to do a scientific job we had to make the scientific approach to it and establish a foundation. Number one, does a problem exist; what is the problem; if it does exist, what constitutes the factors that cause this problem, and then we could, having those facts at hand, go ahead and put our attention on the matters that could or should be changed and come up with our suggestions and recommendations.

That is just very general, but one thing we found in studying and working around trying to see what statistics we could accumulate, that there are not adequate records kept of either accidents and/or these problems where we have very serious congestion. I mean these traffic jams that go on sometimes for hours, as to where we could really sit down and say this is caused by this, or that,

or the other thing. Actually, although accident records are kept, they are not analytical enough for the purposes of making this type of foundation scientific approach. Dr. Wermel might want to elaborate on that as he has spent many days getting at this particular angle, because he is making the scientific approach and is trying to establish a foundation from which to work. Dr. Wermel would you like to elaborate on that just a little at this time for the benefit of the Committee and those in the audience?

DR. MICHAEL T. WERMEL, COMMITTEE CONSULTANT: Mr. Chairman and members of the Committee, in looking over the task before this Subcommittee on Freeway Traffic Control, we tried to put our hands on the central idea and, of course, it does not take long to get at this central idea. The central idea is that travel along the freeways of California is impeded by serious congestion and by bad accidents. If there was no congestion and if there were no accidents causing loss of life and property, if traffic moved along freely, I suppose that we could say that there was no problem of freeway traffic control. Now, there are several things we need to know: First, just what is the extent of such congestion and such accidents? It may be that actually when you put your hands down on the problem you may come to the conclusion that as bad as conditions are, they are, in relation to the total flow of traffic, perhaps not as bad as we are sometimes led to think. That does not mean, of course, that whatever problem there is does not need to be corrected. So, we do have a little better data on just what is the extent of such accidents and congestion.

Our attention is sometimes called by dramatic incidents like the terrible accident which occurred a few days ago just outside of

Los Angeles where six people, five in one family, were killed outright and four injured in one freeway accident. There are many other examples of such dramatic occurrences but actually such dramatic incidents are not a substitute for a careful and level-headed evaluation of the real statistical extent of the problem. So, we have to get at the extent of the problem. The next thing we have to analyze much more carefully is what causes these problems and we know there are several major categories of causes. We know there is always the human element in the driver. That is almost always the originating cause. It is true, for example, of this terrible accident in Los Angeles. Perhaps if someone else had been driving the car rather than the man who caused the accident, maybe there wouldn't have been any accident.

In addition to that, we also have mechanical problems and then we have the interaction of the person with mechanical problems with the problems presented by the road in which the human and the mechanical factors operate. We have in that area certain structural problems relating to the design and nature of the freeways themselves, particularly entrances onto freeways and exits from freeways and the multiple lane problem and things of that sort. We have also problems of direction of traffic through the freeways, such as the system of signs and police enforcement and so forth.

Now, all of these factors combined together produce congestion and produce the accidents which cause the freeway problem and in order to reduce the extent of this, because I do not think anyone is naive enough to think that with the best of effort you can eliminate all accidents and all congestion. To even appreciably reduce it you have to get at it in terms of specific areas - what can be done in

the area of the human problem? Is there something about accident proneness studies that might tell us about additional regulations or licensing or requirements? What is there about the mechanical problem? What are the programs, legislative and otherwise, that might lend themselves to the mitigation of that problem? What is there about the design and construction of freeways that can be done to minimize these accidents and congestion? What is there about the method of regulating traffic through the freeways and methods of enforcement? And, so our task is to get at the basic facts and to be in a position to understand all of these various factors and their importance and the extent to which they contribute to the total problem so that we can then go ahead and consider the various solutions.

CHAIRMAN BACKSTRAND: Thank you, Dr. Wermel.

Next, I would like to read a letter and resolution addressed to this Committee from the Citizens Traffic and Transportation Committee for the Extended Los Angeles Area.

"Gentlemen:

We note with interest your announcement of the subcommittee hearing on freeway traffic control to be held in Sacramento on October 3.

The Citizens Traffic and Transportation Committee for the Extended Los Angeles Area has been vitally interested in freeway traffic control, and particularly the methods by which the efforts of the responsible agencies may be coordinated into a unified program. The Committee took formal notice of this subject by passing a resolution calling for the establishment of formal coordinating machinery. A copy of this resolution is enclosed.

The Los Angeles Area, with its growing network of freeways, presents a vital problem in freeway control. We strongly urge the Subcommittee on Freeway Traffic Control to select the Los Angeles Area as one of the locations for the conduct of future hearings. This Committee, together with many other local groups and agencies, would welcome the opportunity to participate in an area hearing.

Sincerely yours,

/s/ Robert L. Gordon  
Chairman

"



## RESOLUTION

June 29, 1955

"RESOLVED, that the Citizens Committee on Traffic and Transportation recommends that immediate action be undertaken to implement the following proposals and recommendations of the report of the special committee organized pursuant to a request made on December 7, 1954 by Mayor Norris Poulson of the City of Los Angeles to consider certain traffic and freeway problems in Los Angeles, with particular attention to be given to what, if any, State or local legislation might be needed to correct them as follows:

### PROPOSAL TO ESTABLISH BETTER COORDINATION BETWEEN AGENCIES RESPONSIBLE FOR OPERATIONAL FEATURES OF FREEWAYS

In Los Angeles responsibility for Freeway operations is divided between the State Division of Highways and the Police Department.

The Highway Department is responsible for such functions as:

1. Signs, signals, and markings.
2. Regulations such as speed zones and stop signs.
3. Channelization or re-design of entrances, exits, and interchanges.

The Los Angeles Police Department is responsible for such functions as:

1. Enforcement of vehicle code provisions and posted regulations.
2. Policing of accident tie-ups and other freeway "break-downs".
3. Patrol and handling of disabled vehicle problems.

The original design of freeways within the City was by the State Division of Highways or by the Street and Parkway Design Division of the City Engineer's Office acting as an agent for the State. Some operational problems on the Freeways are the direct result of design inadequacies built in the Freeways.

The Traffic Department of the City is responsible for all signs, signals, markings posted regulations, et cetera, on all City streets and, by permission of the Division of Highways, on State Routes which traverse surface City Streets. Where surface street connections meet Freeway termini or access and egress ramps, the functions of this Department are vitally important.

The talents and ingenuity of all of the above mentioned departments must be effectively applied to Freeway operational problems if adequate solution is to be reached. Therefore, it is proposed that better coordination be established between the several departments involved."

## "RECOMMENDATION"

That the State Department of Public Works and the Mayor and City Council of Los Angeles by official order or direction, establish a committee of State and Local officials to conduct periodic conferences for the purpose of reaching decisions on specific operational problems.

These conferences should be attended by accredited representatives of the following:

- A. State Highway Engineers
  - (1) Design
  - (2) Construction
  - (3) Traffic
- B. City Police
- C. City Engineers
  - (1) Traffic
  - (2) Design and Construction
  - (3) Public Utilities
- D. Other local Jurisdictions as required from time to time, depending on the particular situation to be considered.

Some of the specific problems which these conferences would consider and should be expected to reach agreement upon are:

- 1. Design and plan for traffic at temporary Freeway termini.
- 2. Re-design of problem interchanges and ramps.
- 3. Regulations and operational features necessary for the breaking of certain congestion bottlenecks.
- 4. Improved informational and regulatory signing on the freeways.
- 5. This conference Committee might advisedly be authorized to supervise and direct the comprehensive study of freeway operational problems as set forth in the recommendation in the next succeeding proposal.

The Committee suggest the propriety of an official communication on this recommendation by the Mayor of the City of Los Angeles, addressed to Mr. Frank Durkee, Director of the State Department of Public Works.

### PROPOSAL TO ESTABLISH A COMPREHENSIVE STUDY OF FREEWAY OPERATIONAL PROBLEMS FOR THE PURPOSE OF DETERMINING THE MOST EFFECTIVE METHODS OF PATROL ENFORCEMENT, REGULATION AND CONTROL.

Our rapidly expanding system of urban freeways is presenting new and unique problems of traffic control and regulation.

Our great dependence upon the freeway system, which is truly the backbone of our urban transportation, together with the tremendous volumes of persons and vehicles and tonnage of goods carried "

"by urban freeways, is justification for giving a high order of attention to operational techniques which can assure the community of a continuous unhampered service which the freeways should be capable of providing.

Under current conditions of traffic which fluctuate from peak hour volumes in excess of design capacity to comparatively light traffic conditions during off-peak hours the speed of freeway traffic varies from very low speeds to very high speed with frequent complete stoppage of movement at some locations.

Even a minor accident frequently results in a "breakdown" of the freeway and subsequent delay and irritation to many thousands of persons with substantial economic loss.

Disabled vehicles present a unique problem. In some locations the absence of shoulder or other space for parking results in a freeway blockade when a single vehicle becomes disabled. The driver of the disabled vehicle must either depend upon the assistance of a passing motorist, the happenstance passing of a police officer, or he must walk to the nearest exit and seek out a telephone to call for help. At this point he invariably has a very difficult time giving the proper location of his vehicle to his source of help.

In cases of accidents involving serious injury, it is most difficult to get emergency equipment to the scene.

There is still considerable improvements to be achieved in the emergency handling of traffic at the scene of freeway accidents. Techniques have yet to be developed.

Under normal conditions of freeway traffic it is difficult to apprehend and cite a traffic violator and generally to enforce the traffic laws which apply.

The inadequacy of present signing methods in relaying proper regulatory and directional information to the freeway driver is so well known as hardly to require comment.

Since the urban freeway system is expanding rapidly and since conditions are expected to get considerably more congested and more trying before they get any better it is urgently necessary that careful study be given to the above operational problems and others which have arisen or which may arise in the future.

#### RECOMMENDATION

It is recommended that a detailed practical study be made immediately of the operational problems of urban freeways, the study to be made on portions of selected freeways within the City of Los Angeles as a joint project of the State Division of Highways and the City of Los Angeles. The interest is joint. The study should be made jointly and the cost jointly borne."

"It is suggested that the Division of Highways be asked to provide and to conduct research upon directional signing; regulatory measures including speed control; automatic traffic control devices; and means of communication such as emergency telephones and other electronic communication systems.

It is suggested that the City provide a specially created squad of adequately equipped police and that the City conduct research upon the methods of patrol and apprehension; handling of traffic at accidents, tie-ups, and bottlenecks; methods of removal of injured from accidents; methods of handling disabled vehicles; and methods of communication.

It is recommended that to implement this study the State Division of Highways be asked to budget a minimum of \$150,000 annually, and the City of Los Angeles be asked to budget a like amount, both for an estimated period of two years, the funds to be used both for the installation of equipment and the remedial measures necessary to conduct the study and for the purposes of the study itself.

It is suggested that these studies might advisedly be conducted under the supervision and the direction of the joint conference Committee as recommended in the next preceeding proposal, to establish better coordination between State and Local agencies responsible for operational features of freeways."

The reason I read this resolution is that it seems obvious that a great many people, not only the rank and file user of the freeway, but our city, county, and chamber of commerce, and citizens committees of all kinds, recognize the problems and are all trying to see what, if anything, can be done about it and I think this Committee can be of particular value, if we can, and I think we will, come up certainly with some very practical suggestions.

ASSEMBLYMAN LANTERMAN: I wonder if in discussing this problem we have made it clear that these are primarily problems relating to metropolitan areas and that the metropolitan areas are where we find the prime problem of speed, traffic jams and safety? Has that been outlined? I did not hear it specifically referred to.

CHAIRMAN BACKSTRAND: No, it was not specifically referred to Mr. Lanterman.

ASSEMBLYMAN LANTERMAN: Well is that true then?



CHAIRMAN BACKSTRAND: As far as we know, it is true. As I said, the thing we are going to have to use as a foundation is some statistical information, and as far as we know, I think we all would be amazed if it isn't the problem that exists only in certain metropolitan areas. On the other hand, and I am certainly not speaking for Dr. Wermel or the Committee or anyone in the audience, my personal view is that it is an overall problem also, but it is acute in the metropolitan areas. I think statistical information, of course, will tend to prove what you have just said.

ASSEMBLYMAN LANTERMAN: My personal interest in this thing had to do with the fact that three people were killed right within two miles of my home on the new freeway overpass at Devil's Gate. It was unnecessarily brought about by placement of improper barriers and directions of traffic into two lanes without proper warning during the construction period. However, the problem, had the car gone out of control and bounced across the center dividing lane, without any controlling factor there whatever in the nature of steel guard rails to positively keep the cars inside the lanes where they were going, that could never have happened.

CHAIRMAN BACKSTRAND: In this accident to which Dr. Wermel referred, of course, opposing traffic met because there was a spot on that particular freeway that was only divided by a matter of four or five feet. The car went out of control. It is a matter of design to which Dr. Wermel referred.

ASSEMBLYMAN LANTERMAN: Those are the factors with which I was particularly concerned.

CHAIRMAN BACKSTRAND: We certainly recognize that and as you know on the Arroyo Seco some of those have happened. On the Bay

Bridge and the bridges in and around San Francisco, the same thing has happened. It is obvious that that is quite a problem and no doubt we will be getting into it.

I see that Norman Kennedy of the Institute of Transportation and Traffic Engineering is here and I would like to ask if you will come forward at this time and discuss this matter of statistical information.

NORMAN KENNEDY, INSTITUTE OF TRANSPORTATION AND TRAFFIC ENGINEERING, UNIVERSITY OF CALIFORNIA, BERKELEY: Mr. Chairman and gentlemen, Dr. Wermel has very lucidly set forth the problem which stems from lack of information. He has pointed out that spectacular accidents themselves show us that something is wrong, but we do not in the reporting of these accidents, find the cause. The fact seems to be that accident records, as now gathered, do not clearly set forth causes of accidents. As Dr. Wermel has said, the human element, of course, is always present. It is quite likely that any driver who always had control of his vehicle, who was always alert and so forth, would be able to avoid difficult situations which result in accidents. We know that every driver is not always alert. He is simply using his automobile as a means of getting from point A to point B, from home to work or work to home, or home to shopping or whatever it happens to be, and it is completely unrealistic to blame the driver if his thoughts stray to something other than the actual manipulation of the automobile and as that occurs, he may find himself in a situation which results in an accident. It is certainly true that in spite of many years of accident reporting, we still cannot pinpoint causes of accidents. According to the National Safety Council's accumulation of accident records, some percentage is attributed to vehicular failures themselves - brakes or lights or whatever it happens

to be, but these are only those accidents which can positively be identified as resulting from vehicle failures. There may be others. So, although we can always read into the present accident records and the reporting of some human failure of the human element, we do not know precisely how much of this is positively human, how much of it is precisely vehicular failure and how much of it is due to faulty design or inadequate highways.

May I say one word concerning the design of highways? We probably should not be too critical of the highway designers because something happens in the highway design and construction which sometimes results in accidents. There may be the view that it would be possible to design highways to eliminate all accidents. Whether or not all the highway engineers subscribe to this view, I do not know, I think it would be a little bit difficult to design every freeway so that there would be no accidents. We design them for some designed speed and then drivers seem to want to drive faster. But to get back to the central point, we badly need better accident reporting, and better analysis of data contained in accident reports.

CHAIRMAN BACKSTRAND: Are there any questions from members of the Committee?

ASSEMBLYMAN DILLS: Mr. Chairman, I am wondering if this gentlemen would know whether any study had been made on the freeways to paint signs on the driveway of the freeways of "slow" or "danger" or signs of that kind.

MR. KENNEDY: As far as I know that is not done. However, the directional signing of the Division of Highways here in California is not surpassed in any other part of the country. The overhead signing developed here in California is excellent. There

is some objection to painting signs on the pavement itself. Perhaps I should not say objections, but rather reasons for it not being effective. Cars are moving so rapidly and so closely together that a driver does not see pavement markings on freeways. Certainly the roadside signs are not effective on freeways either. The best sign and the most effective is that placed overhead because it is more nearly in the line of sight of the driver than any other type of sign or marking which can be applied to the highways. Perhaps additional work could be done by the Division of Highways. I do not know, but perhaps additional work could be done in posting warning signs overhead. That would be a matter for detailed study.

ASSEMBLYMAN RUMFORD: Mr. Kennedy, you say you have not made a statistical study of accidents or their types and causes?

MR. KENNEDY: That is right. I have not made such a study, nor has our Institute. However, studies have been made from the accident records that are available and the result is always this: The accident reporting itself does not give us sufficient information to make really true and correct statistical summaries.

ASSEMBLYMAN RUMFORD: Could we say that here in California a great majority of accidents are caused by cars on these freeways that cross the middle lane?

MR. KENNEDY: Assemblyman Rumford, I do not know whether we can say positively whether that is true or not. Certainly the crossing into one lane from another is a hazard. Whether it results in numerous accidents, I do not know and I think we would not be able to find out from our present accident reporting. I believe that that well illustrates the point that we do not know.

CHAIRMAN BACKSTRAND: That is exactly the thing that is



important. We are going to have to go about getting it and at this time, before we get into questioning Mr. Kennedy about some of these corrections such as signing and so forth, I would like to ask Inspector O'Connell if he could give us a run-down on just what information is kept by the Patrol, and if there is any classification and so forth.

INSPECTOR D. J. O'CONNELL, CALIFORNIA HIGHWAY PATROL: Mr.

Chairman and gentlemen, I wonder first, if this isn't to digress, we might delineate the problem a little more closely because it will directly pertain to what we have available. One thing, as pointed out by Mr. Lanterman, is this problem of freeways. In California we have various types of freeways. Very nearly all of our major highways, be they only two lanes, are a limited access type of freeway and that goes from a limited access type of freeway to a complete controlled freeway, however with crossings at grades, which would be a type of roadway like Highway 40, which is known as an express-way, to the primary freeway or the full freeway, as it is known, which is common to Los Angeles and the San Francisco Metropolitan Areas. In the full freeway, there is complete control of accidents and there are no crossings at grades. In other words, all areas of conflict are of the merger type where the vehicles are traveling in the same direction.

ASSEMBLYMAN RUMFORD: Then you can eliminate these factors of crossings as far as vehicular traffic is concerned and the accident? You are more or less confining it now; you have eliminated a certain large group of possible accidents.

INSPECTOR O'CONNELL: We have to a great extent in California because of the type of dividing section or dividing structure

eliminated to a great degree the opportunity for head-on collisions. But as I say, it is just to a degree. There is always the opportunity for head-on collisions when it is physically possible for one vehicle to get through a slot, to hit an on-coming vehicle. Evidence of that is the collision to which Dr. Wermel referred, the six people being killed down on the Santa Anna Freeway, as I recall it. Basically, it would appear to me, and for the consideration of the Committee, that to encompass generally the problems before the Subcommittee, we would care to deal primarily with the full freeway type of installation, because that is the type of installation that is prevalent in the metropolitan San Francisco-Oakland Area, and the metropolitan Los Angeles Area. That is the type of freeway that is carrying these enormous volumes of traffic, and that is the only type of freeway that is carrying these enormous volumes of traffic, and that is the only type of freeway, to my mind, all of the factors in which we are concerned are present.

CHAIRMAN BACKSTRAND: To your knowledge are there any statistics kept on congestion - these traffic jams that go on sometimes for literally hours, thousands of cars have been jammed up, as to what happened?

INSPECTOR O'CONNELL: Unfortunately, I have to concur with Mr. Kennedy on that problem. We can give you statistical information on the accident itself, but we cannot even approximate the thousands of man hours or motorists' hours and the inconvenience and the money that is lost through resultant congestion as a result of an accident or as a result of a simple stalled vehicle. The basic problem, of course, is the congestion. We have built freeways in Southern California, one primarily the Hollywood Freeway,

which was designed for an approximate 120,000 cars per day for a 24-hour period. A recent study of the Division of Highways, a traffic count, indicated some 168,000 in a 24-hour period over that highway, prior to the completion of the highway. You cannot blame the design engineer because he designed it for a capacity and prior to its completion the capacity had been exceeded.

ASSEMBLYMAN DAHL: Do the accident reports made by the CHP give an answer as to the cause of the accident in the opinion of the Patrol?

INSPECTOR O'CONNELL: The accident reports made by the California Highway Patrol will give the primary cause in the opinion of the investigating officer. Now the primary cause may be speed, maybe an unsafe lane change, it may be following too closely, any one of our numerous moving violations. The accident report does not generally go into the secondary or the tertiary causes which might be several other things, such as, this is just for an example, inadequate design, mechanical defect of the vehicle and things of that nature while we maintain that the accident is, of course, the primary driver failure that caused the accident. That is so noted on the report, but there may be other causes of a lesser degree but all in all very materially contributing to the overall accident, and we cannot give you adequate studies on the secondary and tertiary causes of accidents. We can give you the numbers of accidents by type, head-on, rear end, and the primary cause of the accident. Recognizing of course, too, another problem in the reporting of accidents, which I think was briefly touched upon, and that is the volume of jurisdictions who handle accidents, say, on one highway. A freeway in the Los Angeles Area may in the course of seven or

eight miles traverse three or four independent cities, municipalities. The accident procedures while they do approach a semblance of uniformity may not be completely uniform and each municipality investigates the accident in accordance with its own policy and you will have a divergence of opinions and of procedures because of that. If we are dealing with the full freeway type of operation, I think we can provide you with a moderate amount of statistical information as to basic causes, basic causes as being synonymous with primary causes. On our accident reports there are indicated design inadequacies, marking inadequacies and things of that nature, but the accident itself, that would require a hand study of the many accidents. The accidents themselves are coded by the primary motivation of the accident and we can make that information available to the Committee and to Dr. Wermel.

CHAIRMAN BACKSTRAND: Let me ask you this then Inspector. If this Subcommittee developed for the purposes of, say, a sample study of questions and things that we would like to know or should be known about accidents and/or congestion, and if we submitted such a suggested type of report to the California Highway Patrol in these areas we are talking about, do you suppose it would be possible for us to have that type of report available? In other words, if over a period of two or three months we could get the type of information that we do not now have on accidents and congestion and develop a type of question and suggested analysis of these accidents, would the California Highway Patrol help us with that and make that pilot sample study? I know it might take some time and, of course, we could get into the lack of number of officers and all of that, but with what you have available, do you



think you would be able to help the Subcommittee? I am also going to ask that same question of the various police departments and so forth to see if we can develop a foundation report here statistically so that we can concentrate on those things that should be concentrated on.

INSPECTOR O'CONNELL: Mr. Backstrand, if Dr. Wermel and the Subcommittee would formulate those questions, I am assuming now that we would probably be able to provide a great deal of information. If the questions pertain to items of information which we already have, it is only a matter of running it through the punching and sorting machines and we will have the information for you. If it is questions on types of information that is not now gathered, I am reasonably certain the Commissioner would be more than pleased to assist the Subcommittee and run it on a hand tally basis over a period of time for the development and securement of that type of information. I do not envision any problems in it at all. I might make this suggestion that concurrently the Division of Highways furnish such information as is available to them also. They additionally analyze the accidents and probably between the two organizations we would be able to rather closely come to what types of answers you wish.

DR. WERMEL: I would like to make one or two points with both gentlemen. It seems to me that the total problem is the result of many different factors, and in our approach to the solution we want to be very careful not to let this effort to find the answers degenerate into some kind of a witch hunt because people have all kinds of preconceived notions. Some people think that the whole problem is compulsory inspection, so we start with the idea of

studying vehicular problems. And, of course, if we do that we can find all kinds of statistics and all kinds of evidence and even before starting they come out with the answer. Or they can start with some very, very strong notions on the human problem and accident proneness and come out with a whole program of different type of licensing or enforcement or recording of violations or what not. Or you can start with the business of dividing the freeways and go full blast with the Highway Department. Whereas, actually all of these factors are important and all of them enter into an interaction and create the sum total problem with which we have to deal. It may be that some of them lend themselves to correction easier than others and the reason why I think it would be well for us to start with an overall consideration of the different categories is in order to avoid the pitfall of trying to rationalize some preconceived notion as to what causes all of these accidents.

Now, concretely if it were possible to develop an outline of an analytical report in cooperation with some of the best scientific talent we have here, such as represented by the Institute and whomever else can help, and then let us say take a sample area for two or three months and have this analytical report used by the Highway Patrol, by the police departments, by the enforcement agencies all the way through, it may require some coordination to bring that about, it may also lead eventually to some recommendations on the part of this Subcommittee for uniformity in accident statistics and accident reports. Could we then over a period cover the sample and develop these analytical reports which would help us get an objective, an unbiased picture, which includes all of the factors? I think that might help us get away from the

difficulty of placing all the blame on entrances to the freeways, or exits from the freeways, or signs, or dividing lines because all of these factors figure somewhere in the total picture.

INSPECTOR O'CONNELL: Well, Doctor, I concur and I am reasonably certain Mr. Kennedy concurs that there does not appear to be any divergence of thinking. The various facets involved are all a part and parcel of the entire problem before us and it would be completely unreasonable for any segment of enforcement or engineering to point the finger at someone else and say it is his fault or their fault. There is a combination of deficiencies as represented by all of those agencies involved with the administration of traffic movement on the freeways and the building and design of freeways and I believe that we can work out something very amiably between those agencies involved to attain the desired result and that is toward the development of some factual information. We recognize that we will develop some information toward which there would appear to be no immediate solution, but in so doing we will probably develop some information which will ease the overall problem.

ASSEMBLYMAN REES: I have a couple of questions, one is that I am of the impression that in regards traffic volume handled that there are probably less accidents on a freeway and less fatal accidents than on other types of streets. What would you say about that?

INSPECTOR O'CONNELL: Your impression, Mr. Rees, is entirely correct. The closer you approach toward the complete or full freeway, where you have no crossings at grade, the lower your death rate per hundred million vehicle miles traveled. The reasons for that are completely obvious. There is less opportunity for vehicle conflict. Recognizing, too, that you carry tremendous volumes of

traffic on freeways and you would build up your miles traveled at rather rapid rates, but conversely, possibly as of interest, some of our expressways in California, which are the four-lane highway with crossings at grade, their accident rates approach the accident rates for two-lane highways in millions of vehicle miles traveled and, of course, the primary reason, at least to our mind and I believe the engineering people will concur, that you take a highway such as Highway 40 between here and San Francisco and the facility is a nice modern type of highway and as you drive down that highway you feel reasonably protected that you are not going to be caught in a side type or a right angle type of accident. Our information indicates that 42% of all the accidents on the expressways are intersection accidents. Of course that is because of the fact the driver has a feeling of confidence and gradually increases his speed.

ASSEMBLYMAN REES: What I wanted to lead up to is that perhaps accidents are not the worse thing that could happen to a freeway. I am worried about the mental health of the people who live in these city areas. About a month ago there was an article in the Mirror, a Los Angeles newspaper, about some poor guy that got in one of these jams and if you have ever been on this freeway going into downtown Los Angeles or coming back, you get in a jam, someone blew a tire, or crumpled a fender, and after 20 minutes there he all of a sudden said to hell with it and froze completely at the wheel. They had to practically pry him loose from the wheel and then they took him over to Georgia Street Receiving Hospital and it was diagnosed as practically the same thing as shell shock. I think this will continue because the jams seem to be getting



worse and worse, and I think we would be doing a great favor to the stability of our urban areas to perhaps figure out how to eliminate the jams.

INSPECTOR O'CONNELL: I am strongly inclined to agree with you, Mr. Rees. There is a tendency upon the part of the average motorist who will travel five miles out of his way on a surfaced street to travel two miles on a freeway and I think another rather important factor of this overall problem might be a driver conditioning or a driver education recommendation coming out of the Committee. Actually, it sounds a little ludicrous, but it is a fact, they will drive considerably out of their way to take advantage of a very short stretch of freeway.

ASSEMBLYMAN GAFFNEY: Inspector O'Connell, do the accident forms filled out by the Patrol now have space for the patrol officer to set down what he believes was the factor, that is in cases where there is not a citation for human failure; that it might be attributable to highway design, it might be attributable to other causes? Is there a space on the present form filled out by the patrol officer to give that statistical information?

INSPECTOR O'CONNELL: Yes, Mr. Gaffney, there is. We punch some 80 items off each accident report. That is it goes on IBM type of cards - some 80 items which break down all of the various things that could possibly happen. Now the accuracy, as I say, of the secondary and tertiary causes might not be reflected. For example, possibly to clarify what I have in mind, you have a vehicle traveling eastbound in the center lane of a freeway and he changes lanes and sideswipes another vehicle along his right. The apparent cause of the accident, of course, or the primary cause, is an unsafe lane

change, a violation of Section 526, but possibly the driver has a defective right eye, one possibility. Secondary possibility is his windshield on the right-hand side of his vehicle might be frosted. In other words, there are other things which are vitally important in the gathering of statistical information for analysis as to accident contribution that may not be reflected in the report. In other words, the accident report would indicate a mechanical defect on the windshield, but when we run the card through the sorting machine, it would come out with a lane change being the primary cause of the accident.

ASSEMBLYMAN GAFFNEY: Could this Committee be furnished with a copy of that blank form?

INSPECTOR O'CONNELL: Yes. I might point out that generally the city police departments within California use a form somewhat similar to the Highway Patrol form. Many of the smaller departments use the Highway Patrol form itself and the other larger departments use a form which encompasses generally the same areas as the patrol form.

CHAIRMAN BACKSTRAND: Mr. Kennedy, would you like to comment on that.

MR. KENNEDY: Mr. Chairman, it seems to me that we could not disagree that the reports filled out by the California Highway Patrol and other enforcement agencies do contain a good deal of information. It is my impression, nowever, that not all accidents are investigated by the California Highway Patrol or other enforcement agencies. May I ask if that is true?

INSPECTOR O'CONNELL: That is correct. Our best estimate now is that we investigate 100% of the fatal accidents and in the area

of 90% of all the injury accidents, that is a physical examination at the scene of the accident. The investigation of the property damage accidents which may contribute just as materially as a fatal accident to the congestion on a freeway, is dependent upon the policy in the individual area, or the individual jurisdiction. The California Highway Patrol investigates all accidents that are brought to its attention. Many of the local departments do not investigate property damage accidents below a certain level of damage, but the amount of damage incurred in an accident may not materially make any difference as to whether or not 10,000 people were tied up for three hours on the freeway.

MR. KENNEDY: Mr. Chairman that is precisely the point that accidents do occur which are reported only by the people involved in the accident if they are reported at all. If I understand the situation correctly, our Vehicle Code, the California Vehicle Code, calls for a reporting of accidents which result in personal injury or property damage of \$100.00 or more. That is not true in some of our neighboring states. For example, in the State of Oregon, all accidents regardless of severity are reported. Under our law, quite likely accidents occur which are not reported by the people involved and it is very possible that a slightly different situation in that accident would have resulted in property damage or fatality, rather than a clashing of fenders, which was not reported. The point I wanted to make is this - that although the reporting of the California Highway Patrol does ascertain causes of accidents, the primary causes, and as nearly as possible the secondary and tertiary causes, there are accidents occurring which are never reported.

DR. WERMEL: Isn't it true that there are some instances of

very bad congestion involving a waste of very much time and contribution to the type of nervous problem to which Assemblyman Rees referred which are not really results of accidents? I want to be very careful not to generalize from personal limited experience. I travel the freeways every day and just to give you an illustration - on the Hollywood Freeway we have one area which has two egresses, very close one to another, Sunset and Hollywood. Why there should be two exits one block apart is something that is kind of hard to see, but they are there, and immediately after the Hollywood exit, there is a very sharp upgrade increase because the freeway goes up over a bridge, over a superstructure, and whenever ~~there~~ there is a heavy truck going through there it is always forced to slow down to let the Sunset and Hollywood cars out. He cannot pick up the speed in that area, he has to slow down and then he comes down to the bottom and has to start pulling up that sharp hill without any momentum and the result is that sometimes, 40, 50, or 60 cars get tied up. Well, if as a result of this tie-up somewhere down the line, perhaps two or three blocks back, one car hits the other one, then you have an accident and the accident is examined and reported and maybe you will have the cause, congestion due to inability to pass through this bottleneck or however else it may be coded. But, a lot of times there will be no accident and maybe the freedom from accident will be purchased by this terrific taxing on the individual nerves of all the people who are going through that area, but there will be this taxing on the nerves of people, plus an increase in the proneness of accidents in the future because it fatigues people, plus the tie-up of many other vehicles and the consequent loss of time. Now, what I am really asking is this. When you have instances of bad



congestion that are not caused directly by accidents, are there any reports covering those? Very often I see the police go out there on the motorcycle and try to straighten things out, but do we have any data at all on bad congestion which is not caused by accidents, but are caused by other things? I am impressed with the point made by Assemblyman Rees, we are really not exhausting the whole problem when we look at it only from the point of view of accidents and that there are very many other dimensions to it besides.

INSPECTOR O'CONNELL: Dr. Wermel I would say that yes, the information is somewhere. Now the information to my knowledge has never been correlated or coordinated at one central place. If there is a tie-up let's assume on the Bay Bridge, both the Engineer's office and the Highway Patrol's office at that area have that information as to the duration of tie-up. Probably the Los Angeles Police Department has information at their local level as to duration of tie-ups on the various segments of freeways over which they have control. But to my knowledge that information has never been gathered statistically and combined into any type of report.

ASSEMBLYMAN RUMFORD: May I just say that it seems to me at this point that unless we get the figures and facts that we are in the abstract. It would appear that Dr. Wermel has a job ahead of him, securing and digesting what charts there are from the Department and then bringing that information back to this Committee so that we can talk about the results of his findings. We might be able to draw some conclusions on congestion and accidents and the causes, other than that we do not even know what we are talking about.

ASSEMBLYMAN DAHL: Does not Dr. Wermel's question reflect

itself in the design of the area in which he was speaking? He points out two off ramps a block apart, indicating a hill immediately following that - doesn't that make a category in our reporting of bad design?

INSPECTOR O'CONNELL: You gentlemen from the Northern part of California are reasonably familiar with the Bay Bridge, on the Bay Bridge we had probably one of the first in California a full freeway type of installation, no crossing at grade and no access, other than the areas to come on to the Bay Bridge. Through a rather extensive type of service car and patrol car operation, your tie-ups on the bridge are cut to minimums because there are vehicles patrolling that area at all times. There are tow service cars, pick-ups, so that stalls can be removed from the area. Recognizing it is only six miles long, the expenditure of money is in the hundreds of thousands of dollars per year to maintain that service in order that the best carrying capacities of the facility might be attained. We have comparable problems on say the new freeway in San Francisco, the new ones in Los Angeles. Your congestion factors can be cut down we feel through the development of some type of a method to remove obstacles as expeditiously as possible. I say some types. It is still widely open to study. That might be another area that this Subcommittee could consider and recommend. I understand that the Los Angeles Police Department at the present time has in their budget money for a helicopter. They gave consideration to one of the large type helicopters which would physically remove vehicles from the freeway. It sounds rather odd at first but gentlemen it could do the job.

CHAIRMAN BACKSTRAND: I think the Committee should know

that in Detroit some experiments are now going on in central traffic control by the use of television, closed circuit television. The installation of that television is being made by the telephone company and we have already started to get whatever information we can relating to that experimental job that is being done there in Detroit. They have written to me and said it will probably take another month or two before they will be able to give us a good report of that particular experiment that is going on with closed circuit television.

Commenting briefly on Assemblyman Rees' comment about accidents on these freeways, I think it is a fact that the safest freeway in the world, I have been told this by competent authority, is the Los Angeles installation of, I believe it is the Hollywood Freeway. It is actually the safest in terms of vehicle miles. However, I do not think we can afford to be complacent on that fact, because we do have accidents and we can say it is safe. Certainly it is safe in terms of vehicle miles, but there is no reason to just rest on our laurels and ignore the troubles because we do have these accidents. We do have congestion. There is loss of life. There is economic loss of time and damage and all of the other things. I feel sure that Dr. Wermel and Norman Kennedy have developed a point here that if this Committee is going to do a job, then we are going to have to have a foundation from which to work as Assemblyman Rumford has clearly outlined.

ASSEMBLYMAN LANTERMAN: Has any experimental work been done in any respect relating to warning lights on freeways in congested areas, either a slow-down warning yellow light or in the nature of a block system automatically enacted for purposes of traffic control?

Has that been done at all in any respect by the Highway Department?

MR. KENNEDY: Not in the State of California, as far as I know. If you are asking if this has been experimentally tried, the answer is yes. On the Pennsylvania Turnpike some work has been done on developing signal lights and signs and so forth which warn motorists of temporary hazards. It might be weather conditions. It might be an accident or something of that kind. Something of the same kind is being used to some degree on the New Jersey Turnpike. This, however, is in the experimental stage and is much the same as this television traffic control in Detroit. Incidentally, Mr. Chairman, at the University's Annual Street and Highway Conference in February, we are asking a man from Detroit to come out and report on their use of television on their freeway controls. May I make one more point? Dr. Wermel asked the question about congestion, not related at all to accidents. Yes, there is congestion which has nothing to do with accidents. The congestion results from too many people trying to use the freeway at the same time. Now Inspector O'Connell pointed out that the Hollywood Freeway was designed for 120,000 vehicles a day or something of that kind, whereas it actually carried 168,000. The California Division of Highways and every highway department in the Country designing and building freeways, designs a freeway lane for 1500 vehicles per lane per hour. That is about one vehicle a little more than every two seconds. On the Hollywood Freeway, 2,200 vehicles per lane per hour are being carried in four lanes in one direction, or in other words, 8,800 vehicles in four lanes in one hour. Now at the rate of 2,000 vehicles per lane per hour we are getting a vehicle past the point every 1.6 seconds. That is a very high degree of concentration of



vehicles. This in itself results in congestion simply because speeds are lowered to something like 30 or 35 miles per hour, rather than the 50 or 55 miles per hour for which the freeway was designed, so congestion does result from too many people trying to use a freeway. There may be no accidents at all. This situation would be rather difficult to correct unless you could devise a means of keeping people off the freeways during the period when they were overcrowded.

ASSEMBLYMAN WILSON: Inspector O'Connell, in connection with the comments about the Bay Bridge, hasn't part of that been psychology because of the signs posted which indicate a \$5.00 fine will be assessed in the event of anyone running out of gas.

INSPECTOR O'CONNELL: I will say this, Mr. Wilson, it certainly has a deterrent effect on those who might be prone to run on low gas tanks, but there are other factors, such as the tire changes. Now this is purely recollection to my mind, they average some 30 stalls a day on the Bay Bridge, that is stalled vehicles exclusive of accidents. But the immediate availability of emergency service to get that vehicle out of the traveled way has materially contributed to the overall passage of vehicles over the bridge and we have to recognize, too, that the Bay Bridge cannot even closely approximate new highway design. The Bay Bridge has traffic lanes of nine and a half feet in width, whereas the new freeways are generally twelve foot in width. There are no storage lanes on the Bay Bridge. In other words, you are in the traffic lane or you are not on the Bridge. Whereas, the Division of Highways, particularly here in California, in their later designs on freeway construction are providing storage on the right and left side of the roadway, so that a vehicle that is disabled can be gotten off, at least out of the main traveled

way. That costs a great deal of money but it was necessary, at least in the thinking of the Division of Highways and certainly the Patrol concurred, that you would not get the full utilization out of the freeway if you could not remove the impediments from the freeway.

ASSEMBLYMAN WILSON: I was wondering if a similar type of sign system indicating heavy fines for any type of cause of delay on express or freeways might be followed more extensively on all of our freeways, similar to what they do on the Bay Bridge? Or do you think it would have any value?

INSPECTOR O'CONNELL: I frankly have no formed notions on it. It is certainly an area that might be well explored, particularly insofar as the gas is concerned. The other things certainly are not primarily by just driver negligence - the other type of stall and mechanical defects.

ASSEMBLYMAN WILSON: Do you find that motorcycles are much the accident hazard on freeways as they are on regular roads?

INSPECTOR O'CONNELL: That is rather a broad question. Let me put it this way. To do an adequate job of freeway patrol during periods of congestion, you have to use a motorcycle for the law enforcement agency.

ASSEMBLYMAN WILSON: I am thinking of people other than law enforcement.

INSPECTOR O'CONNELL: And statistically, a police officer has 216 chances to one of getting killed on a motorcycle as he does in a squad car. Now what the contributing factor of motorcycles, that is civilian or lay motorcycles, would be to the overall accident pattern, I would have to run a study on it. I could not approximate.

ASSEMBLYMAN KILPATRICK: Inspector O'Connell, it has occurred

to me that maybe on some of these very heavy freeways like the Hollywood Freeway that there should have been provided another lane which would be known as the enforcement lane where the traffic officer or possibly a lane in which disabled cars could be moved and I wondered if that wouldn't be a justifiable addition to our present freeways?

INSPECTOR O'CONNELL: Mr. Kilpatrick, possibly I did not make myself clear. The latest design on our California freeways, wherever it is feasibly possible, is to provide room for disabled vehicles. In other words, the Division of Highways has very definitely recognized that problem and did recognize the problem previously, prior to the construction of the latest type freeway, that they were bound by the regular dollars and cents economic factor that if you provide an extra lane or an extra space, you are taking a dollar away from the other end of the freeway.

ASSEMBLYMAN KILPATRICK: Then that could be used, too, as an enforcement convenience?

INSPECTOR O'CONNELL: Yes, it is a very definite enforcement convenience.

ASSEMBLYMAN KILPATRICK: Then it seems to me that a lot of time is lost on the freeway which is very valuable time too, considering the flow of cars coming down to a point where the congestion is taking place. The officer may have to walk a very long distance before he can even get to the actual scene of the congestion and therefore it would look to me like it would be entirely reasonable that an extra lane should be provided.

INSPECTOR O'CONNELL: I think that possibly at this point it might be well to bring out one other fact, that is a material contribution to the overall congestion and that is that many of our

freeways are not as yet completed and generally the access, the areas of egress to the freeways have been completed; say in our Metropolitan areas, and then as it approaches the suburbs, it is still in the process of construction and until such time as the Division of Highways has had an opportunity to build all the divergence ramps, you are going to have construction where you have four lanes channeling into two lanes and six lanes channeling into one lane. That is the problem that as years progress will to a certain extent eliminate a rather major portion of the congestion.

CHAIRMAN BACKSTRAND: Thank you, Inspector.

I would like to say this. We are talking about suggestions and these are all very valuable and worthwhile suggestions and questions, but still and all we have to come back to the main point, that we cannot prove any of these things as of right now and if we cannot, how in the world is this Committee going to really do a scientific job? I know everyone that ever drives a car on the highways has ideas of changes and additions and causes and all of those things, but you still have to come back to the main point that actually we cannot prove any of these. I might have a lot of ideas and no doubt the Inspector has, every member of the Committee has ideas, and all of the several million licensed drivers. Probably you would get a good many thousand different suggestions, but you could not prove any of them. So, I would like to suggest, coming back to the point developed earlier, that we do need some, let's say, broader information. I am going to ask Mr. Kennedy and others here a question. In order to develop this factual data that we are going to need as a foundation, would you Mr. Kennedy and Inspector O'Connell be willing to serve on a small advisory committee to sort of set up this



type of reporting as was suggested earlier for a pilot study? You would not be able to use it in your IBM machines, but for the purpose of this Committee and our studies, and perhaps a representative from the Los Angeles and San Francisco Police Departments would also serve on this committee to develop this factual questionnaire. Also the two automobile clubs could assist.

INSPECTOR O'CONNELL: May I add one more - the Division of Highways?

CHAIRMAN BACKSTRAND: Yes, the Division of Highways, I think also should be represented on the committee. As long as you all can, I will make that a request from the Committee. Did I understand, Mr. Gaffney, that you offered that as a motion that this Committee ask that such an advisory committee be formed? All those in favor say "aye".

MEMBERS OF COMMITTEE: AYE.

CHAIRMAN BACKSTRAND: I am going to name Dr. Wermel as Chairman so that he can call you together for an organizational meeting.

Sergeant Keegan, I understand that Officer Fay is also with you, would you two gentlemen like to come forward and make your suggestions to the Committee? We are very pleased that you could take the time and trouble to come here from San Francisco.

SERGEANT JOHN KEEGAN, SAN FRANCISCO POLICE DEPARTMENT:

After hearing all the troubles of the Southern part of the State of California, I think we are very fortunate in our Bay Area. We have a Commission who are very prone on traffic. If we have a ten minute delay in San Francisco, we get the devil blown out of us, so we do not have much congestion, but we do have congestion. We

have two bad points and that is on the Bay Bridge and southbound out of San Francisco and our critical point, I would say, would be on the freeway, southbound, where we have an on-ramp and an off-ramp within 4,500 feet of each other. And, we have quite a merging of traffic, 3 lanes merging at all times. That off-ramp traffic, at the last count, shows the same volume as the through traffic leaving San Francisco, so we have quite a bit of traffic. We have about 80,000 cars a day pass that one point. As they come off the freeway, they come to a surface and they go by our Farmers' Market and it is planned in the near future to put signals at this point. You will have a lot more congestion when that does happen, so it has to be redesigned in that neighborhood. We also have trouble at the extreme end of San Francisco where they leave the County and go into San Mateo County. To augment our traffic we have changed our laws and extended our tollway period to 7:00 at night. We have moved the buses off the main stem, around the corners and out of the way of traffic. As we get to the intersection of San Mateo County of Geneva Avenue and the Bay Shore, that is our first tie-up. It is a tie-up both ways, north and south, but it does not affect us in the north-bound because the traffic is laying in San Mateo County. So, that is our two bad points.

Someone asked about the vices of signing for congestion and things like that. We have worked out with the State Highway and the Department of Electricity of San Francisco to install devices at the entrance or the on-ramps of the Bay Bridge and the freeways, but we can detour if we get the word, which we can when we have a patrol on there, you'll flash onto the end of your entrance to leave and go by another way, which can be done. But, I think that the biggest trouble is that we do not have an adequate patrol. Our Police Department

patrols the freeways for one shift only, that is in the evening, so we should have more patrols, whether the police do it or the State do it, it should be controlled.

ASSEMBLYMAN RUMFORD: Sergeant, do you have any information as to the type of accidents that occur most on the highways, or on the freeways?

SERGEANT KEEGAN: Yes, we have quite a complete record.

ASSEMBLYMAN RUMFORD: Is it available to the Committee?

SERGEANT KEEGAN: That is right.

ASSEMBLYMAN GAFFNEY: In answer to Mr. Rumford's question, there has been 52 P.M. accidents and 20 A.M. accidents since September 1, 1954. Did most of them occur at that critical merging point coming off Army Street?

SERGEANT KEEGAN: I think it is marked in the report which one is there. There is a report showing in that critical area what happened there.

ASSEMBLYMAN GAFFNEY: What would you suggest in remedying that - only a patrol? The design is already there.

SERGEANT KEEGAN: It would have to be redesigned in some form.

ASSEMBLYMAN GAFFNEY: How much space is there between the Army and the other ramp?

SERGEANT KEEGAN: 4,500. There should be some way to take that traffic off the main freeway and have it out of the way of the oncoming Army Street ramp traffic, it should be above that.

CHAIRMAN BACKSTRAND: Sergeant, you say you keep complete records . . .

SERGEANT KEEGAN: Of all reported accidents, yes.

CHAIRMAN BACKSTRAND: Are there any records kept at all and

how complete are they, on congestion, I mean the thing which is a contributing factor to accidents.

SERGEANT KEEGAN: We follow the State form.

CHAIRMAN BACKSTRAND: You see what our problem is, and as you can gather, there are suggestions and questions having to do with design, other suggestions and questions having to do with enforcement, others having to do with signs and warnings, and all of those things are very, very worthy and we will no doubt be going into them quite thoroughly. But number one, coming back to the main thing that has been developed here, is that we are just going to have to prove, for our own Committee's satisfaction, just where the greatest areas of problem do exist. Dr. Wermel, do you have any comments?

DR. WERMEL: Sergeant Keegan, do you have in your Department some sort of an analytical group that analyzes these accident reports?

SERGEANT KEEGAN: Yes, we do.

DR. WERMEL: Did you at any time in the recent past, make any analyses to the end result being some recommendations? That is the point I suspect, of analyzing these records and statistics to find out what was wrong and going out to correct it?

SERGEANT KEEGAN: That is right. We do that.

DR. WERMEL: Do you have the recollection, off-hand, as to what some of the major recommendations are that were made as a result of the analysis of this data?

SERGEANT KEEGAN: One-way streets, signals, and parking restrictions - those are the three main items.

DR. WERMEL: Did you make any particular analysis of the problems caused recently in San Francisco by these run-away trucks?

SERGEANT KEEGAN: They are happening every day. We have two or three cars a day running off our hills.

DR. WERMEL: Have you made any recommendations along those lines?

SERGEANT KEEGAN: They have a committee on that and I did not happen to be put on that committee.

CHAIRMAN BACKSTRAND: Thank you Sergeant Keegan and Officer Fay and we shall be calling on you for assistance I am sure.

Mr. Cheshire do you have any comments to make?

HARRY CHESHIRE, AUTOMOBILE CLUB OF SOUTHERN CALIFORNIA:

Mr. Chairman and members of the Subcommittee, let me just very briefly say that one or two points I think are quite important that have been brought out here this morning and one of which is the reference to the fact that we are dealing not only with an accident problem but also with a congestion problem. I think that was important, when we start analyzing the accident record on the freeway. Then, too, those accidents which do happen on the freeways may, in part, be due to congestion factors. Now, all of these things may not be susceptible of concrete analysis. Some of them I am fearful are going to be a little intangible to say that an accident occurred two miles back because of some congestion that occurred two miles ahead, but I do think that is important in the work of this Subcommittee in analyzing freeway traffic control.

Another thing I thought was particularly interesting was Dr. Wermel's comment as to the possibility of a pilot study. I think in that respect it would be important as to how much the enforcement agencies will be able to make special studies because I have in mind, with what little contact I have had with accident



reports, accident investigations, that they do tell of some immediate causes, but in order to ascertain some of the underlying causes, it may be necessary to make a special investigation into particular accidents that have occurred. I think it will be dependent upon the staff and the ability of some of the enforcement agencies and the Division of Highways. I think the local traffic engineering departments, where they exist, could be brought into it too, in order to make a more complete analysis of the accident records. Now, I am sure that our organization will do everything that we can to assist the Committee.

CHAIRMAN BACKSTRAND: Thank you very much, Mr. Cheshire. You mentioned that congestion is a contributing factor, I just would like to comment on my own personal observations, Inspector O'Connell saying that a report may show an unsafe lane change, but there is no way of knowing but what congestion might have occurred, might have forced this oncoming vehicle to try and swerve because of somebody in front of him and here you have an unsafe lane change. Of course, you could say that he was following too closely, you can add a lot of those things together, but the basic thing might very well be either poor design or something else way on up ahead, a long distance from where the actual accident occurred and those are some of the things that I hope that we may be able to get some information on in the pilot study.

ASSEMBLYMAN LANTERMAN: Do we know the scale or the factor of safety involved in the design of center dividing strips in the designing department of the Engineering Department of the highways? In other words, what I am getting at - has there been a determined factor of safety as to curb height and possible speed usages of

of the areas on both sides to make positive separation of these high speed alternate lanes as we know them. They are in some of the congested areas in Los Angeles freeway design.

CHAIRMAN BACKSTRAND: Perhaps Mr. Gilliss could answer that.

C. M. GILLISS, DEPUTY DIRECTOR, DEPARTMENT OF PUBLIC WORKS:

Not in the engineering design, Mr. Lanterman, but to your question there has been and there is a continuing study on the curb designs and in fact this very last year we cost the State probably quite a few dollars in damaged automobiles in designing curbs and actually taking the vehicle and running it at various speeds and various angles into those curbs. The total results of those experiments are not yet completed.

ASSEMBLYMAN LANTERMAN: The reason I asked that question, Mr. Gilliss, is relating to the pickup several months ago in Los Angeles on the Hollywood Freeway that jumped the center dividing lane and rammed head-on, out of control, into the opposite lane of the opposing traffic, which caused several deaths and was quite tragic and the thing that I have in mind is whether or not the design of the curbs actually impede or assist the cars in not climbing up over them and whether or not we are going to have to have the steel barrier as the only answer to keeping these cars out of the lane?

MR. GILLISS: The accident involving a car jumping the center strip is the infrequent accident, but it is always very spectacular. There is contending debate whether you should design the barrier so that the car is thrown back into the traffic lanes it is traveling in, or protect instead the very infrequent situation where the car is inclined to jump over into the opposing lanes. The accident rate on freeways, and I think the Doctor will bear me out, is something

like 5 or 4 to 1, more favorable than the accident rate on other highways in California. And the consideration of the design of the separating barrier is one of the primary considerations in the safety record that has been built.

ASSEMBLYMAN LANTERMAN: The heights of the curbs then would have a very definite influence on whether the wheel could climb or whether by contact could be warded off and perhaps skate along that surface until such time as control of the car was regained?

MR. GILLISS: That is correct.

ASSEMBLYMAN GAFFNEY: Mr. Gilliss, I notice that in this tentative report of the San Francisco Police Department, they mention along the same line that you were discussing with Mr. Lanterman. They mention a center island, a four-foot center island, augmented in the center with flexible steel guard rails, presently used on curves on our highways. Openings should be provided through islands if guard rails are installed for use by emergency vehicles, only, but the most important factor is police control, 24 hours daily. But, I think they have in mind the peculiar design of our freeway in San Francisco, they possibly had to be that way. Continuation of curves at a great altitude from the street level, swinging curves. You get off one curve and you swing into another curve and I have noticed that while there are warning signs to slow to 30 miles, a lot of motorists do not do it, but do you have any comments along that line, Mr. Gilliss?

MR. GILLISS: I think when this Committee decides that it is going to cover a particular area of freeway design that we should have competent engineers here at your invitation to discuss it.

CHAIRMAN BACKSTRAND: Thank you, Mr. Gilliss.

Is there anyone in the audience that would like to be heard at this time? Mr. Carpenter?

RICHARD CARPENTER, GENERAL COUNSEL AND DIRECTOR, LEAGUE OF CALIFORNIA CITIES: The only thing I would like to say Mr. Chairman is that when you do have your analytical report prepared, we will certainly encourage a representative group of cities to cooperate and get you the information you desire.

CHAIRMAN BACKSTRAND: Thank you very much.

If there is no objection from the Committee, I would like to have the authority to possibly expand this advisory group beyond those that were named.

ASSEMBLYMAN GAFFNEY: I move that it be done at the discretion of the Chairman.

CHAIRMAN BACKSTRAND: All those in favor.

MEMBERS OF THE COMMITTEE: Aye.

CHAIRMAN BACKSTRAND: There being no objections, it is so ordered. If there is no further business, the meeting will adjourn.